

had it not been for similar subsequent discoveries elsewhere.

M. Émile Cartailhac and the Abbé H. Breuil have recently studied with great care the wall paintings and engravings at Altamira. The cavern is a series of large chambers connected by passage ways. There is no evidence of its having been occupied by either man or beast since the close of the Quaternary, at which time the entrance was completely closed by a fall of earth and stones.

A second recent fall has afforded a new opening to the cavern, reached by clambering over the débris that closed the original entrance. The first chamber is divided by means of a mass of fallen stones. The one on the left is 40 metres long by 20 metres wide. The one on the right is a sort of corridor connecting with other chambers. Industrial remains of the floor deposits are confined to the entry and the chamber on the left. There is evidence that the cave bear had occupied the cavern before man took possession. Figures, engraved or painted, are found on the walls of every part of the cavern, especially on the ceiling of the chamber on the left, near the entrance, where the frescoes are remarkable for their beauty, size, and good preservation—a sort of Sistine chapel representing the *chef d'œuvre* of perhaps more than one Michael Angelo of that far-off time.

These works of art represent a variety of technique. Some are simple line engravings. Others are more deeply incised. But the engravings are not so numerous as the figures represented in colour. Many are done in a single colour, either red or black. The most remarkable are the polychrome frescoes similar to those of Font-de-Gaume already described.

The figures are not all animal representations. Many are signs, the significance of which is not known. They do not belong to a single epoch. The superposition of figures, each in a different technique, studied in connection with the relative state of preservation of the various figures, has furnished a key to the order of succession. The same succession is traceable in the caverns of France, so that the Abbé Breuil and his colleagues, MM. Cartailhac, Capitan, Peyrony, and Bourrinet, have been able to distinguish four distinct phases¹ in the evolution of mural painting and engraving, all of them being represented in the cavern of Altamira.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

CAMBRIDGE.—The following Graces passed the Senate at Congregations held on February 1 and 2:—(1) That, in accordance with recommendation i. contained in the third report, dated November 13, 1906, of the special board for mathematics on the mathematical tripos, the regulations for the mathematical tripos, part i., contained in the report, be approved (placet, 776; non-placet, 644). (2) That, in accordance with recommendation ii. of the same report, the regulations for the mathematical tripos, part ii., contained in the report, be approved (placet, 780; non-placet, 638). (3) That, in accordance with recommendation iii. of the same report, the temporary provisions for the mathematical tripos, alike under the old regulations and the new regulations, contained in the report, be approved (placet, 777; non-placet, 637).

The Adams prize for 1907 has been awarded to Dr. E. W. Brown for his essay on "The Inequalities in the Moon's Motion due to the Direct Action of the Planets."

Mr. Douglas W. Freshfield will deliver a public lecture on Ruwenzori, at the Sedgwick Museum, on Thursday, February 14. The lecture will be illustrated by lantern pictures, including many taken during the Duke of the Abruzzi's expedition.

The special board for biology and geology has nominated Mr. C. Shearer, Trinity College, to use the University table at Naples for three months from March 1.

MR. FRANCIS GALTON, F.R.S., has given a further sum of 1000*l.* to the University of London in aid of the study

¹ A fifth and closing phase is discernible at Marsoulas, resembling somewhat the work on the painted pebbles of Mas d'Azil.

of national eugenics founded under his previous benefaction. Mr. David Heron has been appointed Galton research fellow in national eugenics, in succession to Mr. Edgar Schuster, resigned.

SIR COWASJEE JEHanghir READYMONEY has, says the *Times*, offered to the Bombay Government the sum of 2½ lakhs of rupees (16,666*l.*) for the erection of a university examination hall in Bombay, thus following the munificent example of his father in giving to the city the Elphinstone College buildings and the Senate hall of the University.

THE annual general meetings of the Association of Technical Institutions will be held at the Clothworkers' Hall, Mincing Lane, E.C., on Friday and Saturday, February 8 and 9, as follows:—on Friday afternoon the presidential address will be delivered by Sir Horace Plunkett, K.C.V.O. On Saturday morning the following papers will be read and discussed:—the cooperation of adjacent authorities in the supply of higher technical education, Principal A. F. Hogg; monotecn institutions, Mr. Charles Harrap.

SIR A. B. W. KENNEDY, president of the Institution of Civil Engineers, speaking at a dinner given by the Carpenters' Company on Monday to a number of eminent members of the engineering profession, remarked that the idea of thirty or forty years ago that the training of an engineer should be specialised has passed away. It is now recognised by all engineers that their profession is one at bottom, and that therefore an engineer should have a thorough general training in scientific work which should be the basis of all his future work, and that he should only specialise when it is necessary to do so to earn his daily bread.

THE inaugural lecture to the courses on Japanese education, to be delivered under the Martin White benefaction in the University of London by Baron Dairoku Kikuchi during the spring and summer terms, will be given at the University, South Kensington, on Thursday, February 14, at 5 p.m. Sir Edward Busk, Vice-Chancellor of the University, will preside. Admission to the inaugural lecture will be free by ticket, obtainable on application to the academic registrar at the University, South Kensington. Arrangements have been made for a course on Japanese educational administration to be delivered at the London School of Economics, and for courses on Japanese educational methods, to be delivered at University College, Gower Street, and King's College, Strand.

THE annual court dinner of the Leeds University was held on Thursday, January 31, and was attended by His Excellency Baron Komura, the Japanese Ambassador to this country, as the chief guest. Among those present were the High Sheriff of Yorkshire, the mayors of many neighbouring boroughs, representatives of various education authorities, technical institutions, grammar schools, and other bodies. Baron Komura, in proposing the toast of the University, referred to the debt of gratitude which Japan owed to the educational institutions of England, and among them to the University of Leeds, which has numbered a good many young Japanese among its students. Since the granting in 1904 of the Charter establishing the University, a new capital fund has been raised by private donations which now amounts to 82,300*l.* New buildings are in progress to accommodate the department of mining and metallurgy, and other important extensions rendered necessary by the growth of numbers in the University are under consideration.

THE council of the University of Manchester has decided to institute two new lectureships, one in economic zoology and one in economic botany. The lectureship in economic zoology will provide further instruction in special subjects for the senior and honours classes in zoology, and the lecturer will devote a portion of his time to the preparation of reports on animal parasites and pests. An important part of the duty of the new lecturer will be to conduct research on such subjects as the fauna of reservoirs and sewage conduits, the life-history of animal parasites, and on other matters of economic importance. The lecturer in economic botany will give instruction to

special classes, and will assist in arranging and making accessible to students and to the public the collections of plants and plant products possessed by the University. It will also be his duty to examine and report upon such specimens of plant-diseases, of timbers, and of other vegetable products, as may be sent to the University and to the Manchester Museum for identification, and to conduct special researches in economic botany.

THE annual distribution of prizes and certificates to the successful students attending the colleges and schools conducted in London by the City and Guilds of London Institute, was held at the Mansion House on January 31. The Lord Mayor presided. Sir Edward Busk, Vice-Chancellor of the University of London, in the course of an address referred to the suggestions of the departmental committee of the Board of Education for the amalgamation of the Royal College of Science, the Royal School of Mines, and the Central Technical College at South Kensington in one great technical college. He sees no reason why such a scheme cannot be carried out. The Royal College of Science would be the nucleus of the scientific side of such a technical college, and the Central Technical College would be the nucleus of the engineering side. He earnestly hopes that the governing body of the new institution will take measures to ascertain that candidates for admission already possess a sound general secondary education. At present the students who come up have not sufficient general knowledge and culture. Sir J. Wolfe Barry, in proposing a vote of thanks to Sir E. Busk, expressed the hope that a start would soon be made with the development at South Kensington of a great college for technical education.

AMONG the most recently announced gifts to American seats of higher education may be mentioned the following, recorded in *Science*. As already announced by cable (p. 237), Mr. J. D. Rockefeller has given the University of Chicago 540,000*l.* for its permanent endowment, and 43,400*l.* for current expenses and special purposes. Among the special provisions of this latter gift is one to provide permanent increases in the salaries of instructors, 8000*l.* Mr. Rockefeller's gifts to the University of Chicago are said to amount to more than 4,000,000*l.* It is announced that 65,000*l.* have been subscribed toward the 100,000*l.* endowment which is being raised to mark the seventy-fifth anniversary of Lafayette College. Of this sum, Mr. Andrew Carnegie has given 10,000*l.* for a mechanical engineering course. He will give an additional 10,000*l.* provided the 100,000*l.* is obtained. A further gift of 10,000*l.* from Mr. Andrew Carnegie to Bates College is announced. Mr. Carnegie's offer of this amount stipulates that friends of the institution shall subscribe 20,000*l.*, and this amount has been secured. Mr. Carnegie has also given 150,000*l.* for the construction of a building to be used by the Bureau of American Republics. Provision for the site already has been made by the United States and the South American Republics.

A LONG communication to the *Times* by Mr. A. Mosely again directs attention to American methods of education. Mr. Mosely recently returned from the United States and Canada, where he went to prepare for the arrival of British teachers who are now at work visiting American schools and studying Western systems of education. He tells a gratifying story of the kindness of the welcome accorded to the visitors. The interchange of views between two great English-speaking peoples must be of enormous benefit to those who are trying to work out practical systems for the education of future generations. Already the British teachers have been impressed with the great belief in the value of education shown by Americans. Mr. Mosely points out that this belief in education finds a ready echo amongst all classes of society, who are prepared to pour out money, both through taxation and by princely gifts, for education. The material advantage of the American system of education is manifesting itself by the prosperity of the country and by the flow of inquiries at the doors of every university and place of higher education for the services of the students as they graduate. In fact, there are many applications for every pupil available.

One of the most noticeable features in the United States is, the letter continues, the desire of the pupil, ably backed by the parent, to take full advantage of the magnificent system afforded by the country of practically free education from the kindergarten to the university.

THE final report of the Royal Commission on Trinity College, Dublin, and the University of Dublin has been published. The recommendations of the commissioners and the decision of the Government, as announced by Mr. Bryce in reply to a deputation on January 25, have given rise to much discussion. The difficulty in connection with the establishment of a satisfactory system of university education in Ireland is a religious one. As the first conclusion of the commissioners states, Trinity College has been, and is, a satisfactory organ for the higher education of the Protestant Episcopalian population of Ireland, but it has never been, and is not now, to an extent adequate to the reasonable requirements of the country, an organ for the higher education of the Roman Catholic population. The important matter is somehow to secure for all Irishmen who desire it the benefit of university education, and, in view of this paramount necessity, we welcome the scheme outlined by Mr. Bryce as being likely to consolidate educational effort and to free institutions of higher instruction from impediments arising from sectarian animosities. The Government appears to have decided that the University of Dublin shall be enlarged so as to become a national university for Ireland, which will include as constituent colleges:—Trinity College, a new college in Dublin, and the Queen's Colleges in Cork and Belfast. In regard to the new college, it is to be furnished with adequate buildings and laboratories, and it is hoped that on the science side use may be made of the Royal College of Science, and that its laboratories and apparatus will be the means of effecting the change economically. The funds at present used by the Royal University—which is purely an examining body—are to be employed for the purposes of the new college and the proposed University of Ireland generally. It is intended that the new university shall be absolutely unsectarian, and that there shall be no tests for governors, fellows, teachers, students, or examiners. Though there are signs already that the proposals of the Government will in some quarters meet with great opposition, we are hopeful that it will prove possible to establish in Ireland a comprehensive university which will include eventually every Irish seat of learning reaching a proper university standard.

SOCIETIES AND ACADEMIES.

LONDON.

Royal Society, November 22, 1906.—"The Relation of the Kidneys to Metabolism." By F. A. **Bainbridge** and A. P. **Beddard**. Communicated by Prof. E. H. Starling, F.R.S.

The effects of removing the greater part of the total kidney weight of cats were studied; a portion of one kidney was removed at one operation, and some weeks later the opposite kidney was removed. After the second operation the animals refused food and lost weight, though not more rapidly than normal cats kept for twenty-four hours without food. The increased output of urinary nitrogen described by Bradford was not invariably observed, but in some cats, which refused food after the second operation, the output of nitrogen was increased, though not to the amount found before the second operation. Moreover, the output of urinary nitrogen did not rise until the animals had lost about 25 per cent. of their body weight. A similar rise of nitrogen has been found by many observers in normal animals, when the body fat has been largely used up, and energy has to be supplied by increased proteid katabolism. It may be concluded, therefore, that the increased output of nitrogen observed in cats deprived of three-quarters or more of their kidneys is the result of inanition; no evidence was obtained that the kidneys directly influence nitrogenous metabolism.

Bradford found that dogs, after excision of part of one kidney, were apparently unable to pass a concentrated urine. The authors find, however, that under the same